

TRAINING IN AGRICULTURE

Education for the Farmer as it is given at the New Hampshire College of Agriculture and the Mechanic Arts. A description of what Agricultural Education means and the practical and scientific studies

Aims and Scope of the Courses in Agriculture

The aim of the agricultural courses of the New Hampshire College of Agriculture and the Mechanic Arts, is to help along the higher education of the rural people and their elevation, in both a business and a social way. To this end it is believed that every young farmer needs a double education: one that is practical, to fit him for his profession; another that is cultural, to fit him to live. The first to provide the most efficient methods for his support; and the second to train and develop his mind for the best and highest living. In every sense these courses of the college seek to provide an education which will best serve the needs of a rural people living in a cultured nation, and under a free government.

In order to meet the wants of every young man of the state who desires instruction in agriculture, the college offers four distinct courses: the four years' course aims to give a training that is thoroughly practical as well as scientific in agriculture and its various branches, such as dairying and horticulture. The strictly technical portion constitutes about one third of the course. Of the remaining two thirds of the course, more than one half is prescribed in the sciences. This is done for the training and information they give, and to fortify the technical work of the course. Because of this, and because the subject-matter and the methods of the technical portion lie so fully within the domain of science, the course is essentially scientific rather than literary, and it is believed the sciences afford a favorable field for the development of the higher faculties of the mind. Yet the college is mindful of the fundamental character of history, literature, philosophy, and ethics, and political science as training studies, and reasonable attention to these subjects is required.

The two years' course is designed to meet the needs of those who are unable to take the longer course. It is specially devoted to the study of practical agriculture and horticulture and their various branches, and the natural sciences which are so closely related to successful farming.

The ten weeks' winter course in agriculture is established to meet the wants of those who can spend only the winter term at the college. The important and practical subjects of agriculture and horticulture receive principal attention.

The ten weeks' dairy course is a course in practical butter-making, in accordance with the most approved methods of the modern creamery.

Methods of Instruction and Equipment

Instruction is by laboratory work, supplemented by text-books, lectures, and reference readings, which are almost constantly assigned from standard volumes and periodicals. Laboratory methods of study are peculiarly suited to the subjects of these courses and the needs of the student, and a liberal equipment is being provided for student use and for purpose of illustration.

The equipment of the technical work of the course is rapidly increasing. The department of agriculture has fitted up laboratories for investigation in soil physics and in the mechanical analysis of soils. The dairy department is equipped with a modern creamery for pasteurizing, separating, creaming and churning, and for investigation in dairy bacteriology.

The college owns five Percheron horses, herds of Jersey, Guernsey, and Ayrshire cattle, and grades of several other breeds, and Berkshire and Chester White swine, which are available for illustration and practice in expert judging.

The department makes free use of the fields, orchards, gardens, in which the Agricultural Experiment Station conducts experiments in methods of culture, effects of several practices upon yield and upon fertility, varieties of fruit, vegetables, and forage crops. The methods employed and the results obtained are freely used for instruction. This is most readily accomplished, because the instructors are also in charge of the experiments.

In work other than purely technical, the agricultural student meets the same instructors and enjoys the same privileges as other students of the college, and in all departments the laboratory method is freely employed,

in which the student uses apparatus with his own hands, and consults the literature of the subject at every step.

Terms and Vacation and Self-support The first term this year begins September 7, 1899, and closes December 20. The second term begins January 11, 1900, and closes March 21, 1900. The winter term in agriculture begins January 11, 1900.

The course in dairying begins at the same time, although students in dairying can enter at any time, as the creamery is in operation during the whole year.

There is a large amount of work on the college farm, Experiment Station, campus and the gardens, orchards, greenhouses, etc., which is done by students, and for which they are paid current prices for such labor. By this means, with what can be earned during the summer vacation, it is possible to defray all the necessary college expenses. Work, however, is not guaranteed to any.

Conant Free Scholarships in Agriculture Twenty-eight Conant Scholarships (each paying the sixty dollars for tuition and fifteen dollars for incidentals and twenty-five dollars besides which goes to the holder), are given to students in agriculture. Under the present arrangement, two students in the four years' course are appointed by the officers of each Pomona grange in the state. Under the same arrangement the same officers are privileged to appoint two students annually to the two years' course with free tuition.

GENERAL PLAN OF THE INSTRUCTION

The student taking the regular course in agriculture enters the Freshman year in the same studies and classes with all the other students of the college. His instruction consists of advanced mathematics, rhetoric, French,

etc., for fundamental and cultural value, and elementary work in manual training, drawing, botany, physics, and surveying.

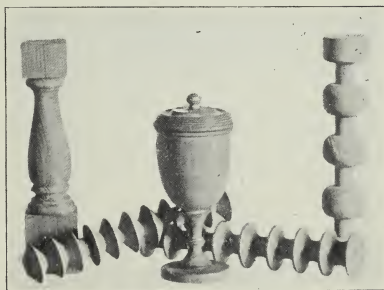
Drawing

The new student, in beginning his Freshman year, takes up at once the study of drawing. Not with the idea of receiving an "accomplishment" or learning how to make "pretty things," but because it broadens and refines and leads him to a keener appreciation of the beautiful in Nature. Besides, a knowledge of the elements of drawing in its theory, practice, and history, makes art more applicable in matters of everyday life.

Drawing is introduced early in the course because it trains the eye and hand to act in unison and prepares the student for his work in botany, entomology, and farm equipment.

Shopwork

The agricultural student also begins work in the shop in the fall term of his Freshman year, and devotes two full terms, or nearly two hundred hours, to this work. The shop practice is of the nature of laboratory work, and relates to the primary operations of joinery, such as exercises in the use of tools, putting tools in order, and the construction of a series of exercises in carpentry, wood turning, and pattern making, including sawing, planing, mortising, splicing, framing, and other work involving the use of ordinary carpenter tools; also work in blacksmithing, and the forging and welding of iron and steel, and other work that is of use and value to the operator on the farm.



**Surveying,
Botany,
and
Physics**

The Freshman, in the spring term, takes up three new subjects that deal directly with his work in agriculture in his Sophomore year. These are surveying, botany, and physics. The class-room work in surveying and agricultural engineering is supplemented by practical exercises in platting, including compass, transit and plane-table and level work. The student receives complete instruction for making farm surveys for area and drainage, etc. An advanced course is also given, which treats principally of systems of drainage, construction and improvement of highways and ordinary highway bridges.

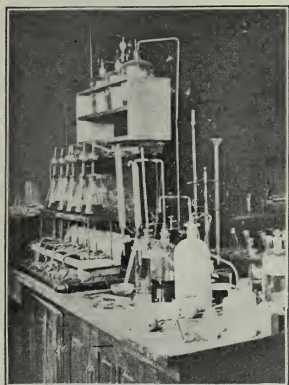
Inasmuch as the general laws of mechanics, acoustics, heat, and electricity are so important to the farmer, four terms are devoted to physics. The work consists of lectures and recitations, supplemented by experimental work in the laboratory. The same methods are employed in teaching botany. The in-



struction begins with lectures and laboratory study of the minute structure and physiology of plants with special reference to the higher forms, and continues through economic and physiological botany and a study of some of the more important fungous diseases of cultivated plants and the means of preventing their injuries.

The study of this science is entered upon in the first term of the Sophomore year, and continues through the Junior year. The elementary chemistry consists of lectures and chem-

ical manipulations.



The lectures are illustrated by appropriate experiments, and embrace the history of chemistry and laws of chemical combination; elementary substances, their history, geographical distribution, properties, combinations, and technical uses; and the application of chemistry to agriculture and the arts and manufacture. Following this are courses in organic chemistry, and qualitative and quantitative analysis of various products in their relation to agriculture.

**Zoology,
Entomology,
Ornithology**

The Sophomore in agriculture also takes up work in biological science, which extends into the Junior year. The course opens with a general introduction to the study of animal life, and leads up to the

nature and processes of animal life. Entomology is taken up in the spring term with a review of the classification, structural characters, and biological relations of insects, with a special study of those injurious to cultivated crops and domestic animals, and of the means of preventing their injuries. Lectures on



the relations of birds to agriculture and their relation to each other and to other organisms receive careful attention from the Junior.



The student also during his course receives instruction in Military Science and Tactics, French, German, English Language and Literature, Geology, History, Political Science, Mathematics, Meteorology, Philosophy and Ethics, etc.

TECHNICAL INSTRUCTION IN AGRICULTURE AND HORTICULTURE

Agricultural education consists of the practical application of these various sciences to the processes and practices relating to the arts of agriculture and horticulture.

The courses are designed primarily to afford instruction along the lines that will be of particular value to persons engaged in agricultural pursuits. As will be seen from these pages it has been greatly strengthened along the technical side, and with the increased time devoted to the science and art of agriculture and horticulture, the students graduating from this course will be even better prepared to engage in those professions than those of previous classes.

With the great progress that has been made in agricultural and horticultural practice, a wide field has been opened for instruction in those lines. Not only are we able to avail ourselves of the knowledge of the methods of the successful farmers and fruit growers, but we can profit by the results obtained by the experiment stations of this and other states. Thus the instruction in agriculture and horticulture gives to the student a knowledge of the latest and best methods, and the general scientific training that he receives will enable him the better to put them into practice.

In rearranging the course the sciences have in most cases received increased attention. They are taught

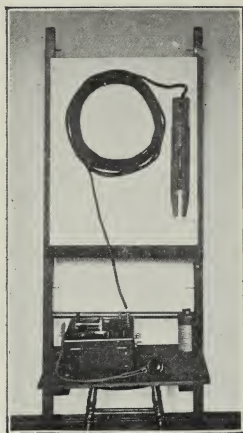
with special application to the crops and animals of the farm, and without the knowledge they afford it will be impossible for any one to farm successfully.

Soil Physics and Fertilizers

When the student reaches his Sophomore year he begins his work in agriculture and horticulture proper. He takes up the study of Soil Physics and studies the soil. He is taught to analyze the soil; he studies the physical properties and finds the number and the size of the grains in the soil. He is now taught the use of fertilizers and how to calculate their value, and



the manner and methods of irrigation and drainage and of tillage, and the effect and use of various farm implements upon such processes. He studies the influence of fertilizers on the amount, character, and composition of crops; effects of particular crops upon fertility and upon each when grown in succession or together; economic sources of the elements of fertility; and fertilizers and manures, their valuation and use under extensive and intensive methods.



During the course practical exercises in testing the physical properties of soils, determining the relation of soils to heat, moisture, air, fertilizers, and making mechanical analyses, are performed.

Farm Equipment

In the same year and following the course in Stock Feeding and Hygiene,

appears the course in Farm Equipment, which consists of lectures and recitations upon the selecting, planning, and equipping farms; planning and erecting farm buildings; farm vehicles and machinery; power, water, and drainage; and practical exercises in drawing plans of farms and farm buildings; leveling and laying drains; dynamometer tests of wagons and farm implements, etc.

Farm Crops

This course is required in the Junior year and consists of lectures and recitations upon the history, production, marketing, and harvesting of farm crops; practical exercises with grown and dried specimens of farm crops, including grasses, clovers, and other forage crops. In connection with this the student studies the theory and science of soil preparation, methods of seeding and tillage of the various farm crops; also the planning of the farm work, including the relation between the number of live-stock and the size of the farm; programme of the work for the season and the management of farm help.

During the Sophomore year and again during the Senior year the young men spend one afternoon each week in the college barns or the barns of the leading breeders of the state in learning the characteristics of the forms of the prominent breeds of horses, cattle, sheep, and swine. They examine the animals, score card in hand, until they are able to discriminate accurately between good and poor animals of the same breed. They learn how to pick out good cows for the dairy or for beef; to select a good roadster or a flock of lambs



for winter feeding. When the eye and judgment have been thoroughly trained, the student may lay aside the score card and form his opinion without its immediate aid. There is great need of better judges of live stock.

The wants of the practical farmer are kept clearly in mind and the trend of the instruction is to make the students thoroughly familiar with the appearance of good specimens of the various breeds and at the same time to make them competent to select good stock or to sell them without being imposed upon by unscrupulous dealers.

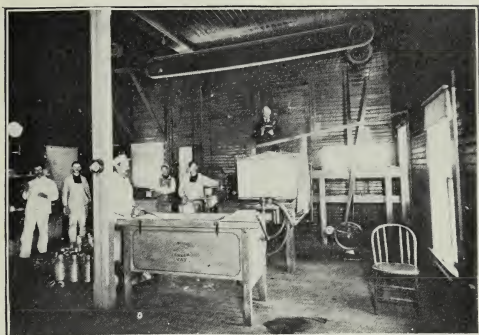
Stock Feeding

This course follows in the winter term after a knowledge of Chemistry has been obtained, for this is necessary to a clear understanding of the principles of stock feeding. The work consists of lectures and text-book work on the principles of feeding and foods and nutrition, supplemented with practical work at the barn, so that the young man can come in immediate contact with the feeding materials that should find place in every stock or dairy barn and learn how to combine and use them. The functional activities of the animal body are first considered and then the foods, in affording the materials for these activities, whether in construction of body tissues or of animal products, as meat, milk, etc.; second, dynamically, as supplying the potential energy for these processes, and for labor, speed, etc. A study is also made of the development of the animal after birth and of the phenomena of animal nutrition from the economic standpoint, in which the animal activity is considered as an agent for transformation of energy and the resultant product as a source of profit.

Breeds and Breeding

During this course the student is taught the principles of breeding and mating animals, and is taught to understand and properly interpret pedigrees. He is taught the origin of the breeds of domestic animals and their distinguishing characteristics; adaptation of breeds for particular purposes and their value for grading, accompanied by critical study and practice in the art of judging both as to breed type and as to constitution and individual merit; also the care and management of the live-stock of the farm as to housing and feed, particularly directed to the economic sources of feeding stuffs, their equivalency, and suitable preparation.

Dairying Instruction in dairying is given to all students in the agricultural course. Methods of securing cleanliness in all dairy operations, of properly caring for milk, of ripening cream, separating, churning, and manipulating the butter, are taught. The dairy-room is equipped with creamers, separators, cream ripening vats, churns, and workers, with the use of which the young men become acquainted by daily exercise.



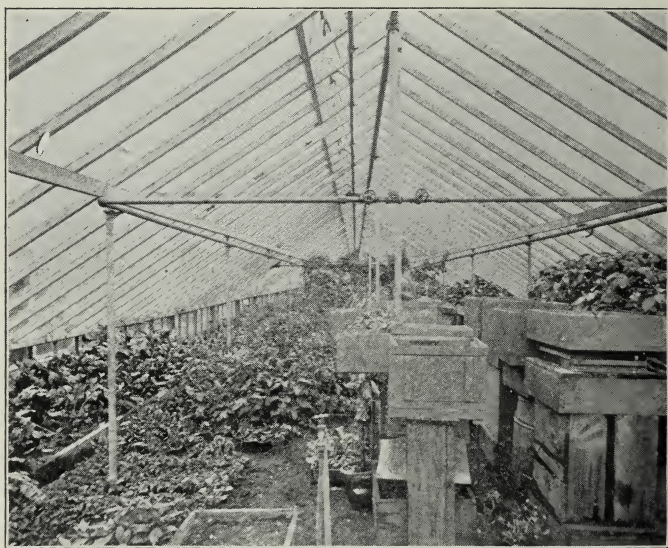
History of Agriculture and Rural Economics The closing work in the Senior year is a study of the history of agriculture and the business side of farming. The present agricultural methods in various countries, the cost and relative profits of the various farm operations and systems, are taught.

HORTICULTURE

Like the technical instruction in agriculture, the work in horticulture begins with the Sophomore year and extends through the Junior and Senior years. In the required work an attempt is made to consider in a practical manner the three divisions of horticulture that will be of most use to the general farmer—vegetable gardening, fruit growing, and landscape gardening.

Vegetable Gardening

The subjects treated include the location and soil, manures and fertilizers, tools and appliances, tillage, drainage, irrigation and similar topics relating to the handling of soil and crops both in kitchen and market gardening, together with a consideration of the various vegetable crops in turn, in their special requirements, including the methods of growing the plants and harvesting and marketing the product.



Fruit Culture

In this study the young men are taught the origin and history of the various fruits; also the methods by which they are propagated, grafted, budded, laid, and the various kinds of cuttings. All the details of nursery work are explained, and the philosophy and art of pruning are treated at considerable length.

As laboratory work in this study, all the students are given actual practice in the various operations of propagating, planting, pruning, and training.

Floriculture, Greenhouse Construction, and Landscape Gardening

These three courses are considered in the instruction both from the commercial and the amateur point of view. All the principal crops of the florist, such as roses, violets, carnations, and chrysanthemums are discussed, and the handling of plants in the flower garden and window also receive attention. The construction of greenhouses for the different crops is also considered.



Landscape gardening is considered as a fine art, and a practical one, and its study is introduced by a discussion of the principles of art in general. These principles are then applied in the decoration of home grounds. The methods of laying out grounds, locating walks, drives, trees, and shrubbery receive particular attention, as does the adaptation of the different varieties of trees, shrubs, and climbers to use in this climate. All this is supplemented with practical and laboratory work.



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Instruction in the Different Courses in Agriculture

The student in the four years' course devotes about one third of his time to technical agriculture and horticulture, and the student in the two years' course devotes over one half of his time to the same subjects. Both cover, practically, the same ground in the technical work, but the former gets the better and more complete training because of his better preparation and equipment.

We recommend in all cases for the student to pursue the regular four years' course, when practical. But, if his course must be limited because of time or money, we



should recommend, then, the two years' course, or even the winter course.

It is the sincere aim of the trustees and faculty to reach and help as many of the young farmers of the state of New Hampshire as possible.

For further information concerning any of the courses in agriculture, or any points regarding work, scholarships, or any other questions, address the professor of agriculture, Charles William Burkett, Durham, New Hampshire.

For general information regarding the college address the president, Charles S. Murkland; or the secretary, Clarence M. Weed, Durham, New Hampshire.